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UNU-EHS Working Paper Series No. 3

Violence as an obstacle to livelihood resilience in the context of climate change

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December 2014

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This paper is part of a set of working papers that resulted from the Resilience Academy 2013-2014. United Nations University Institute of Environment and Human Security (UNU-EHS) publishes these papers as part of its UNU-EHS Working Paper series.

Series title: Livelihood Resilience in the Face of Global Environmental Change
Paper title: Violence as an obstacle to livelihood resilience in the context of climate change
Authors: Beth Tellman, Ryan Alaniz, Andrea Rivera and Diana Contreras
Publication date: December 2014

This paper should be cited as:
Tellman, B., Alaniz, R., Rivera, A. and Contreras, D. (2014). Violence as an obstacle to livelihood resilience in the context of climate change. UNU-EHS Working Paper Series, No.3. Bonn: United Nations University Institute of Environment and Human Security (UNU-EHS).

Violence as an obstacle to livelihood resilience in the context of climate change

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Abstract:

Central America continues to be a violent region and is prone to increasing climatic shocks and environmental degradation. This paper explores the non-linear feedback loop between violence and climate shocks on livelihood resilience in El Salvador and Honduras, two countries experiencing high rates of violence. The nature of this complex feedback loop is examined by analysing case studies on the community scale, which include challenges in reconstructing community social capital post-Hurricane Mitch (1998) in Honduras and the importance of social capital in community resilience to Hurricane Ida (2009) in El Salvador. We conclude that social capital is central in communities facing violence in order to enhance livelihood resilience to climate change impacts in Central America.

Key words: Central America, violence, climate change, social capital, livelihood resilience

A. Introduction

Global climate change impacts pose serious threats to vulnerable livelihoods exposed to severe violent conflict, increased poverty, environmental degradation, political and economic crisis, and the exacerbation of risks to human security and societal stability of fragile states (Adger et al., 2014; Barnett and Adger, 2007; Hsiang et al., 2013; Scheffran et al., 2012a; Warner et al., 2009). Scholars and political leaders are uncertain about how populations living in the most violent regions in the world will adapt to continuous extreme climatic shocks. Thus, it is crucial to understand the multi-causal triggers and diverse pathways of these compounded risks and identify key characteristics which enhance livelihood resilience and hinder cascading effects that lead to social, political and environmental collapse (Butzer, 2012). This paper investigates key characteristics of livelihood resilience by examining the ability for communities to maintain three key elements; buffer capacity, self-organization and capacity for learning (Ifejika Speranza et al., 2014). In addition to these elements of resilience, social capital plays a central role in how communities respond to climate and violence. Social capital is defined as an asset related to access to networks, family/kin bonds, relationships with the state and civil society influencing trust and social cohesion (Bebbington, 1999; Putnam, 2001).

In order to understand how climate change impacts and extreme violence could drive human insecurity, we must examine the mechanisms that influence low social capital and weak governance structures which can undermine human well-being (Adger et al., 2014). Violence and conflict can be exacerbated by a plethora of social factors that increase negative feedbacks such as high dependence on remittances, demographic pressures and an unequal distribution of wealth (Barnett and Adger, 2007). In addition, developing nations are likely to be the most affected by climate shocks, natural disasters and socio-political conflict (Mertz et al 2009). The cascading effects may further limit fragile governance structures to alleviate problems, leading to increases in migration patterns and conflict in both migrant communities and residents in receiving areas (Reuveny, 2007). Some nation-states in Africa, Asia and Latin America are experiencing both trends: accelerating violent conflict and increasing vulnerability to climate shocks (Scheffran and Battaglini 2010, Sherbinin 2013). These existing regional trends make climate change adaptation extremely challenging.

An understanding of the potential feedback loops between violence and climate change and subsequent impacts on livelihood resilience in countries experiencing high rates of violence is essential to holistically address adaptation. Using case studies based in El Salvador and Honduras, two countries with some of the highest rates of violence in the world (UNDP 2009, Cruz, 2010), this paper explores how climate shocks impact trajectories of violence in post-disaster communities and how extreme conflict conditions affect livelihood resilience before, during and after these shocks. The paper concludes that social capital is crucial to reduce conditions in which violence hinders livelihood resilience in post-disaster resettlements.

B. State of Violence in Central America

Central America has a historical 'culture of violence' which has developed into a violence-prone region (Buvinic, 2005; Imbush et al., 2011). It is considered to be the most violent region worldwide. In global rankings of countries by highest recorded homicide rate, Honduras infamously holds the number one spot and El Salvador is ranked number five (ECLAC, 2013; UNDOC, 2013). The rise in violence trends in the past few decades are linked to transnational organized crime, drug trafficking, guerrilla and paramilitary forces (Imbush et al., 2011; UNDOC, 2013). More recently, there has been an increase in gender-based violence, street crime and illegal or extra-legal force used by government agents (UNDOC, 2013). All these issues are a continual source of fear for citizens, who are exposed to alarming rates of assassination, extortion, kidnapping and coercive *impuesto de guerra*, or war tax payments. These negative impacts affect livelihoods, leading to a deterioration of social capital and socio-economic equality (Cruz, 2011, Salama, 2013).

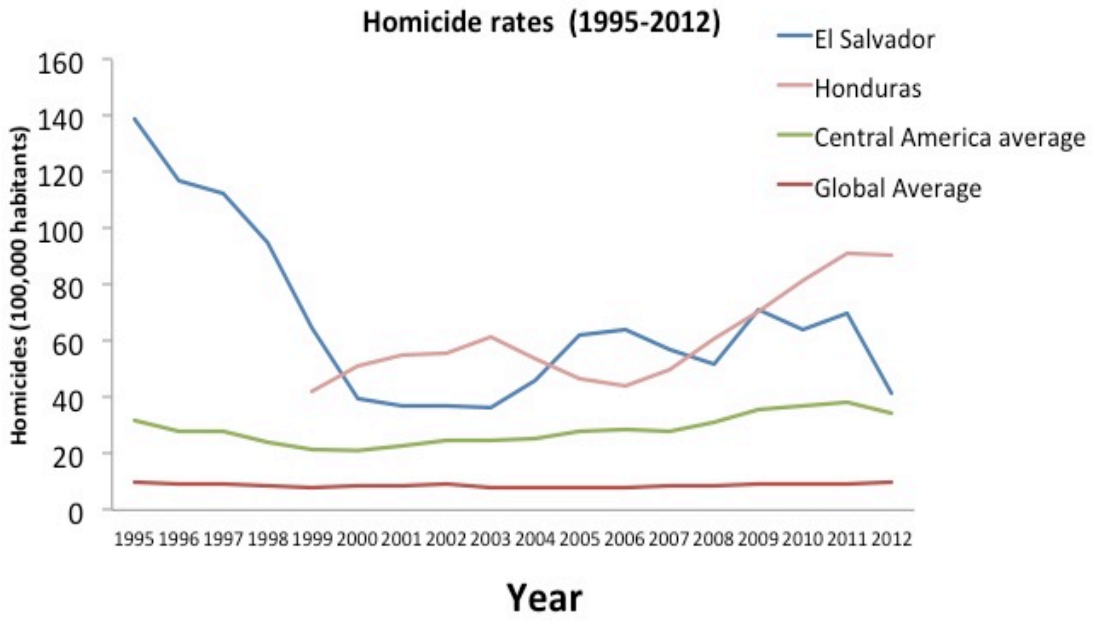


Figure 1. Intentional homicide rate per 100,000 population, from (1995-2012); data from Honduras is only available from1999-2012. Source: UNDOC 2012.

Figure 1 shows the high level of violence in Central America, using homicide as a proxy for violence. Homicide is defined by UNDOC (2013), as "Unlawful death purposefully inflicted on a person by another person." While intentional homicide is only one statistic that describes violence, it is clearly defined, the data is often available (in comparison to other types of violence, such as rape or domestic violence that go unreported) and comparable across countries. Homicide

rates for El Salvador and Honduras are consistently above average in comparison to both Central America and the rest of the world. El Salvador experienced declining homicide rates in the late 90s, likely due to the demobilization and peace process initiated in 1992 after a twelve year civil war, while urban violence has dramatically increased in the past ten years. In contrast, Honduras did not experience the historic internal conflicts seen in El Salvador, with the exception of the 1966, Soccer War and the 2009 coup. However, Honduras has infamously risen as the most violent country in the world, outside of current war zones, due to the transnational drug trade, a weak state and high poverty (UNDOC, 2013).

Though the effects of violence travel through all sectors of society, this paper focuses on the cycle of violence and the erosion of social capital in the context of climate change. Hypothesizing that the deterioration of social capital leads to greater rates of violence and vice versa, especially after a major natural disaster. Social capital, especially 'binding' social capital, or trust between community members, has been consistently found to mitigate the spread of violence across countries and cultures (Lederman et al, 2002; Mcilwaine and Moser, 2001).

Violence in the region has become institutionalized at different scales in governmental, private and civil sectors of society (Winton et al., 2011). Fragile and corrupt states have not been able to address the root problems of violence and overall citizens are dissatisfied and distrust institutional capacities and democratic governance (Perez et al, 2013). This crisis of political and social violence has been theoretically characterized as a change from what Wolf (1969) described as "peasant wars of the twentieth century" to what Beall (2006) now calls "urban wars of the twenty-first century", in part due to the rapid urban expansion and trajectories of transnational organized crime (Rodgers, 2009). In response to this insecurity, some Latin American countries are taking a strong stance, establishing anti-gang laws and *mano dura* (iron fist) policies to combat violence. *Mano dura* is a government initiative of several Central American nations to crack down on gang activity through immediate arrest and incarceration of young men who have tattoos or flash gang signs (Hume, 2007). However, *mano dura* policies have not reduced violence rates and may contribute to increasing crime, by strengthening gang territoriality in confined prisons and enhancing bonds of transnational gangs (Gutierrez, 2010; Swanson, 2013).

C. Climate Change in Central America

Central America will face serious challenges from a changing climate, the IPCC report (2014) noted increments in temperature ranging from 0.7-1°C since the mid-1970s in Latin America. Climate change scenarios also project severe increases by 7 per cent and decreases by 22 per cent in precipitation by 2100 (Magri et al., 2014). Those drastic disturbances may lead to further limitations in fresh water, food availability and access to main food crops such as maize, beans, coffee and rice from regional agricultural production, impacting food security and sovereignty (ECLAC, 2010). In addition, large reductions of overall economic outputs of non-agricultural industries due to strained human labour from heat-related stress may also limit incomes across all sectors (Hsiang et al., 2013.

Nations in the region are also vulnerable to climate variability and impacts from extreme events. These range from increased temperatures, intensification of storm events, floods, sea level rise, coastal erosion, prolonged periods of drought episodes and precipitation linked to El Niño and La Niña Southern Oscillation (ENSO) events (Magri et al., 2014). Climate shocks increase infectious vector-borne diseases and damage weak infrastructure (Moreno, 2006). These impacts may increase urban migration rates and displacement, exacerbating vulnerability of livelihoods as areas in the region are considered to be uninhabitable (forthcoming Wrathall et al., 2014).

More specifically, El Salvador and Honduras have been exposed to multiple extreme events over the past 20 years. The Germanwatch Climate Risk Index, ranks countries that have suffered most from climatic events from 1992-2011 based on five indicators: annual average death toll, death per 100,000 habitants, total losses in dollars - purchasing power parity (PPP), percent of gross domestic product (GDP) and total number of events. Honduras was ranked first as the country that has most suffered from extreme climate events while El Salvador was ranked fifteenth (Harmeling and Eckstein, 2013).

Figure 2. Number of people affected by natural disasters per year (1995-2010). Source: Em-dat

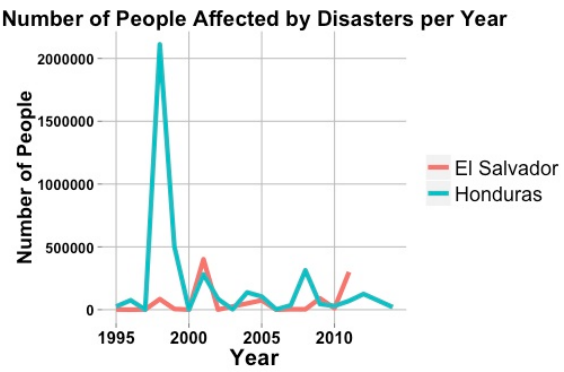
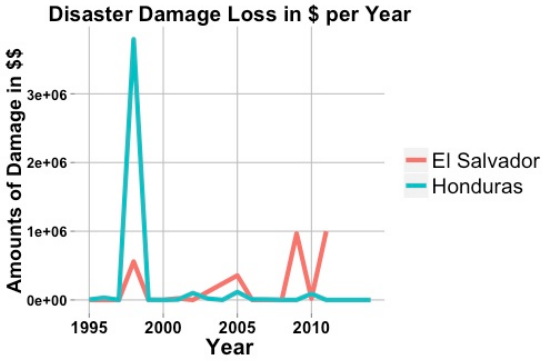


Figure 3. Disaster damage loss per year (1995-2010). Source: Em-dat



Analysing statistics compiled from the emergency events database (EM-DAT) demonstrates the large number of people affected by disasters per year and the costs of disaster damage during 1995-2010 (see Figures 2 and 3). In 1998, Hurricane Mitch, greatly impacted Honduras and stands out as most expensive disaster and the second in the total number of people affected. El Salvador experienced several large disasters in the last decade, namely Hurricane Stan (2005), Tropical Storm Ida (2009) and Tropical Depression 12-e (2012).

D. Violent conflict and the Climate Change Nexus

Research regarding the impacts of climate change on human societies and socio-ecological systems are revealing new insights on direct causal linkages and complex pathways. Yet, the climate and violence nexus has been criticized for lack of empirical evidence linking climatic events and conflict onsets (Bernauer et al., 2012; Buhaug, 2010; Gledistch, 2012; Klompt and Bulte, 2013; Salehyan, 2008; Scheffran et al., 2012a. However, several studies have empirically tested the relationship (Barnett and Adger, 2007; Hsiang et al., 2013; Nel, 2008; Raleigh and Urdal, 2007). Hsiang et al. (2013) shows a positive correlation between climatic changes and increases in human conflict with meta-analysis of over sixty studies. In addition, Anderson and DeLisi (2011), show that warming temperatures may influence irritability, aggression and violent intergroup conflict. Barnett and Adger (2007) and Raleigh and Urdal (2007) demonstrate that livelihoods may be affected by reductions in access and quality of natural resources such as water scarcity and decreased fertility in soils. In addition, Nel (2008) found that natural disasters significantly increase the risk of violent civil conflict in low income and economic growth countries with high levels of inequality and mixed political regimes.

In light of these studies and our own research in Central America we propose a framework that reveals the influences between violent conflict and climate shocks on livelihood resilience (see Figure 4). The conceptual framework describes the multi-directional nature of feedback loops between violence and climatic shock impacts and the influences of social capital on livelihood resilience also hypothesized by Barnett and Adger (2007) and Scheffram et al. (2012b).

We define livelihood resilience and social capital as the following:
Livelihood resilience is related to three main elements: buffer capacity, self-organization and capacity for learning. The buffer capacity of a livelihood is related to the endowments and entitlements within five assets (human, natural, financial, social and physical) which is influenced by the social sphere of self-organization in relation to institutions, cooperation, network structure, opportunities and reliance on own resources. Most importantly, the capacity for learning is a key factor in livelihood resilience. A resilient livelihood must understand threats and opportunities, share a collective vision, commitment to transfer and share capabilities to further increase functioning feedback mechanisms (Ifejika Speranza et al., 2014)

Social capital is an asset related to access to networks, family/kin relationships with other actors, institutions, state and civil society organizational membership, social trust and civic engagement which can lead to social cohesion and social fabric (Bebbington, 1999; Rosenfeld et al., 2001; Putnam 2001). Social capital can be positive or negative (Fukuyama, 2001)

High rates of violence and crime can lead to lower social capital, through the breakdown of trust which dislocates community ties and organization. This lowered social capital can disrupt community self-organization, a key element of livelihood resilience. Lower livelihood resilience will make it difficult for households, communities and even nations to rebound from external shocks,

such as disasters. For example, post-disaster communities that recover slowly due to weak economic growth, social issues (isolation, mass migration, suicide and trauma) or political fragility may be vulnerable to increasing violence and crime, providing additional momentum to the cycle.

Increased crime or violence can also lower livelihood resilience, if extortion by gangs reduces profits or prevents formation of small businesses that help households build up financial capital, or the necessary insurance to recover from climatic shocks. Households with low livelihood resilience that cannot financially recover from a shock may be more likely to migrate internally (Halliday, 2006), often to an urban area (Warner et al., 2009) which lowers social capital, as neighbours in the new settlement are strangers. Particularly in Central America, it is in these overcrowded or informal settlements in cities (slums) where rates of violence are high and still rising.

However, the cycle can also be broken: While low social capital may reinforce feedback loops between violence and climate shock, high social capital can interrupt this loop and stop the vicious cycle. Disasters can provide a liminal space in which citizens can rethink their culture and community. In the case of Hurricane Mitch in Honduras, the external shock of a disaster enabled resettled residents to choose to break the cycle of low social capital and violence it had known in previous communities. By introducing strategies that built social capital while also preventing the infiltration of gang activity in their community, residents were able to reverse the cycle of violence, creating a community with greater capacity to deal with climate shocks in the future, demonstrating 'buffer capacity', a key characteristic of livelihood resilience. Communities with high social capital and characteristics such as a strong collective vision, community organization and a sense of union provide an important safety net that may be able to break the feedback loops in the violence and climate nexus.

An understanding of the potential feedback loops between violence, livelihood resilience and climate change and the characteristics necessary to break them in Central American countries under historical high rates of violence is essential to holistically address adaptation. A micro-scale (community and household level) analysis of local dynamics helps to disentangle this violence-climate-livelihood nexus and draw out lessons that are applicable at the macro level (the state or region) for climate change adaptation.

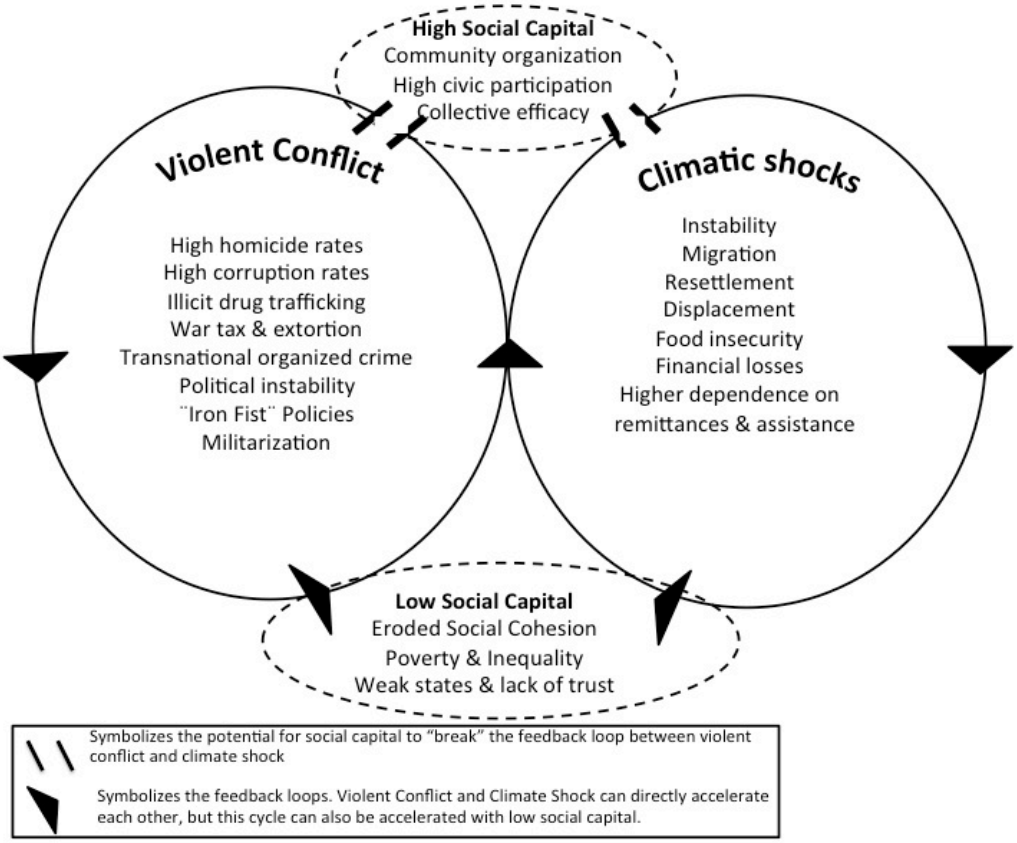


Figure 4. Conceptual framework demonstrating potential feedback loops in the violent conflict and climate nexus which hinders livelihood resilience in Central America. Dotted circles represent endogenous community factors, while solid circles represent factors exogenous to the community
Source: Author's own

E. El Salvador and Honduras Communities as Case Studies

The community-scale case studies explore significant disaster events in the most violent countries in Central America- Hurricane Mitch in Honduras and Hurricane Ida in El Salvador. These cases (see Figure 5) contribute insights and concrete examples that illuminate the nexus described above. Each case analysis is a product of long-term (over five years) research, participatory observation, community surveys, and engagement in the communities studied. The case studies reveal different coping mechanisms to climatic events in the context of vulnerable populations living under violent conditions and environmental degradation. The case studies demonstrate how social capital is relevant to establish resilience at the community level.

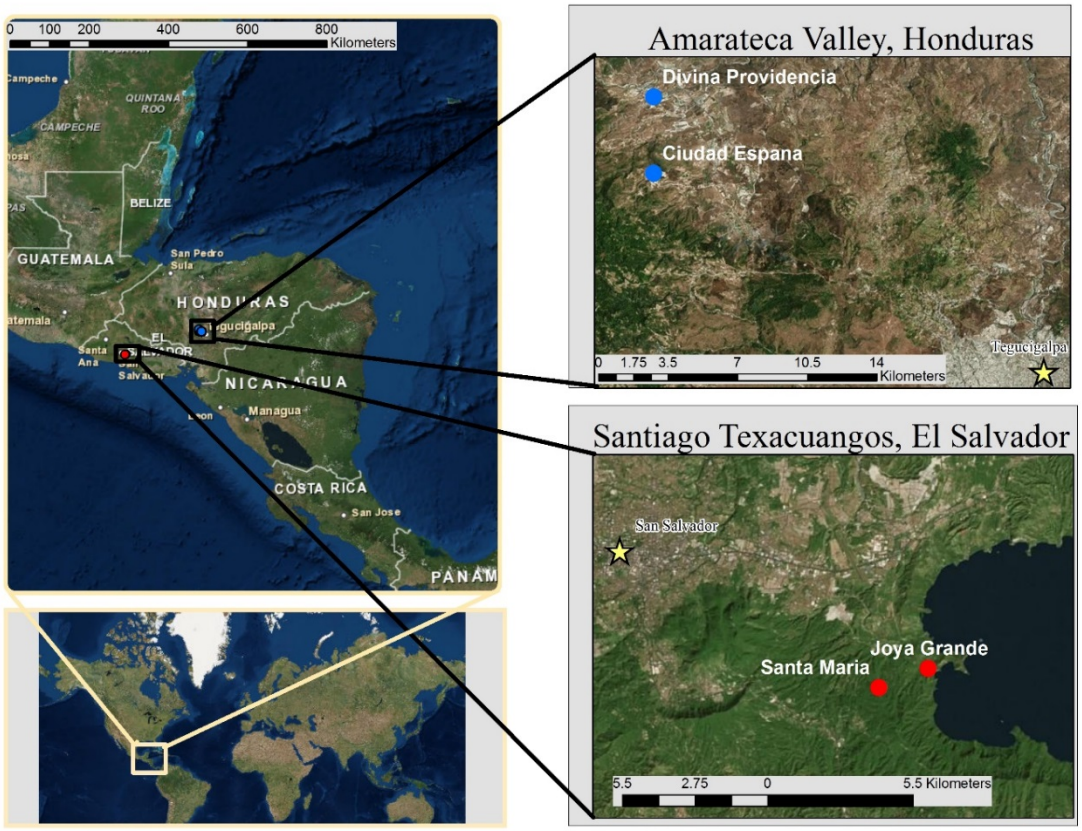


Figure 5. Locations of case studies in El Salvador and Honduras. Source: Author's own

F. Social Resilience to Hurricane Ida and Community Violence Trajectories in El Salvador

1. Disaster and Violence in El Salvador

El Salvador is one of the most disaster vulnerable nations in the world according to the 2011 Germanwatch Climate Index (Harmeling and Eckstein 2013) and the 2005 World Bank Disaster Hotspots (Dilley et al 2005). High disaster risk is a result of combining exposure to multiple threats such as earthquakes, droughts, floods, landslides and volcanoes together with high vulnerability from socio-environmental factors such as population density, urbanization, deforestation and poverty. The small area and high population make El Salvador the most densely populated country in Central America with 292 persons/km^2 (UNDAC 2012). The population is concentrated in urban areas, a trend stemming from mass migration during the civil war (1980-1992), which displaced 737,000 people internally and 1.5 million externally. The dominant internal migration trend was from rural to urban, as the poor fled the violent countryside (Mendoza, 1999).

Urbanization has had lasting effects, changing the geography of poverty; 58 per cent of El Salvador's poor now live in cities (FLASCO-UNDP-MINEC, 2010). El Salvador has the second highest level of deforestation in Latin America, with only 2 per cent of original forest cover remaining (FAO, 2011). Although

poverty has decreased by a third since the civil war, it is currently increasing: The number of households in poverty rose from 30 per cent to 40 per cent from 2006 to 2011 (DIGESTYC, 2011). El Salvador remains one of the 10 poorest countries in Latin America and is in danger of slipping further into poverty if disasters increase (UNDAC, 2010).

Table 1. El Salvador Disaster Statistics, 1992-2012

Event	Frequency	# of people killed	# of people affected	Cost in Billions of $
Earthquake	4	1,160	1,607,771	$1.8
Hydrological	24	1,008	577,843	$2.7
Volcanic	1	2	2,000	Unknown**
Drought	4	0	400,000	$0.22
Epidemic	1	304	50,000	Unknown**
Violence	daily	82,650	Every citizen	~$9*

**represents costs estimates from 1995, 2003, and 2008.*
***Likely low cost due to the infrequency and limited impact.*
Sources: Em-Dat 2012, Acevedo 2008, UNDP 2010, IUDOP 1999, and UNdata 2012.

El Salvador is also one of the most violent countries in the world with homicide rates of around 65 per 100,000 people (Geneva Declaration on Armed Violence and Development (2011). The on-going violence consistently claims more lives and causes more economic damage than all other natural disasters combined (see Table 1). Increasing violence is often attributed to the rising gang influence in the country, with an estimated number of members ranging from 20,000-60,000 (Hellenkamp, 2012; Perez, 2013). However, experts in the Salvadoran Forensic Institute and other civil society organizations report that only a small percent of homicides (10-20 per cent) can be attributed to gang violence, asserting that much of the violence in El Salvador is rooted in international organized criminal networks involved in trafficking arms, drugs and people, money laundering and other unlawful activities (Hellenkamp, 2012).

Repressive state policies such as *Mano Dura*, established in 2003, increased violence rather than reducing it (Perez, 2013). The failure of this policy is seen in Figure 1, showing an increase in homicide rates from 2003 to 2007. While a 'gang truce' brokered by the government in April 2012 temporarily cut homicide rates for one year (see homicide rate drop in figure 1, from 70 in 2011 to 40 in 2012), homicide rates began to climb in May 2013 leading to a declaration by the president that the truce had failed. As of June 2014, the new Salvadoran government has no intention

to continue the truce (Yagoub, 2014).

The country's social, economic and environmental vulnerabilities to disasters are expected to be intensified by climate change. Historically, 96.4 per cent of economic impacts of disasters in El Salvador are due to climatic events and just one climatic shock can devastate the economy (UNDAC, 2010). This case study investigates the social resilience of two Salvadoran communities to a climatic shock, in the form of Hurricane Ida in 2009 (Tellman, 2011). The study includes fieldwork for the five years following the disaster to capture the development of each community. Analysis of the divergent trajectory of violence in these two post-disaster communities provides a concrete example of potential feedback loops in the climate-violence-livelihood nexus. An in-depth analysis of these two communities provides important lessons for building climate change adaptation plans in the context of a violent and vulnerable El Salvador.

2. Hurricane Ida

On 7-8 November 2009, a low pressure system on the tail of Hurricane Ida resulted in an inundation of heavy rain: 355 millimetres over the course of four hours, over El Salvador. Impacts included; 275 people dead or missing, over 75,000 persons displaced and economic losses in crops and infrastructure totalling $966 million dollars (Marroquin, 2010; Proteccion Civil, 2009). Ida was the fourth most economically disastrous event in El Salvador's history, with an estimated 90,000 Salvadorans directly affected (EM-DAT, 2012).

The loss of human life, infrastructure and crops from Hurricane Ida was mainly due to the institutional vulnerability of the national government: Lack of activation of early warning systems, limited budgets for disaster mitigation and lack of emergency plans by Civil Protection - The Salvadoran Government's disaster response division system for over half the country - are largely to blame for exacerbating the consequences of this event (Tellman, 2011). The lack of government response exposed the institutional inadequacy of the state in handling disasters, the consequences of which played out differently, depending on resilience at the community level.

3. Social Resilience in Two Communities in Santiago Texacuangos

A 2010 study of two communities, Joya Grande and Santa Maria in Santiago Texacuangos, El Salvador (Tellman, 2011) explored non-material, sociological phenomena of resilience, recognizing that "social capital is a necessary glue for adaptive capacity, particularly in dealing with unforeseen events…social capital substitutes local management for state control" when the state fails, as it did in the aftermath of Hurricane Ida in El Salvador (Adger, 2003, p. 400).

Santiago Texacuangos, a small peri-urban municipality of approximately 23,000 people (COMURES, 2000) lies 30 minutes south of the capital San Salvador on the south edge of the volcanic crater lake, Ilopango (see Figure 5). The dense population of 534 people/km^2 live in concentrated settlements scattered throughout the mountainsides and ravines, with altitudes ranging from 478-934m. Fragile volcanic soil on steep slopes, population growth during the civil war and deforestation made Santiago Texacuangos vulnerable to landslides

triggered by heavy rainfall from Ida, which destroyed 65 houses and killed 18 people (Proteccion Civil, 2009). Corrupt and politicized aid distribution across governance scales (local-municipal-national) hindered the reconstruction process. The Salvadoran state often relies on non-governmental organizations (NGOs) to perform aid distribution and reconstruction, however, Santiago Texacuangos lacked a strong local NGO network in 2009. As a result, many communities were left without state support in the aftermath (Tellman, 2011).

Participant observation during Ida and its aftermath highlighted that the key to community resilience against this disaster was cognitive (not material) infrastructure (Tellman, 2011). From the many communities in the Santiago Texacuangos district, two provide commonality for a comparative analysis; Santa Maria de la Esperanza and Joya Grande. While these two communities are similar economically and geographically, their divergent development trajectories after Ida offer an excellent opportunity to investigate the mechanisms that led to different social outcomes.

Santa Maria de la Esperanza (Santa Maria) was founded in 1982 by two North American nuns for refugees fleeing persecution in the northern countryside during the war who share a common identity in Catholicism and liberation theology and a strong belief that each person deserves and should fight for human rights. The main political party of members in the community is the Leftist, Frente Farabundo Martí para la Liberación Nacional (FMLN). The community upheld the belief that residents should participate and work together, leading to high community participation through meeting attendance, community workdays, community administered water system and a community store. High participation also led to high organization and social cohesion. During the disaster, Santa Maria lost three lives, four houses, water and irrigation systems and suffered uncountable loss in crops and soil fertility. However, by the following morning, nearly the entire community was sheltered in the church, sharing resources. In the following days and weeks the community leveraged its 'networking' social capital (Adger, 2003) to contact NGOs. It rebuilt the water system, began psycho-social intervention for victims, utilized a previously created environmental risk plan to explore necessity of community relocation and purchased radios for its emergency committee to prepare for the next big storm, illustrating the community's high level of resilience through their quick recovery.

In the comparative case of Joya Grande, the community was not founded during the civil war, however, it grew significantly during this period through rural to urban migration of refugees, who were fleeing violence in the hinterlands. Unlike Santa Maria, refugees were not necessarily connected to any particular religion or political movement. Joya Grande residents' religious preference is fairly evenly divided between Catholics and Evangelicals, political preference is also fairly equally divided between parties on the left (FMLN) and right - Alianza Republicana Nacionalista de El Salvador (ARENA). Community participation in Joya Grande has been historically low; it has no community fund and does not manage its own water supply, meaning it must wait for the slow centralized national government support

to fix water issues. There is no organized work system and in interviews, community members note that the community is not united and rarely works together to solve problems. The disaster was devastating to Joya Grande, with 50 houses and five lives lost. Many families who suffered no damage to their home lost their livelihoods of subsistence fishing or farming.

Recovery in Joya Grande was slow, partially due to the massive devastation, but also due to the lack of community organization. Due to this lack of organization and community leadership there was no attempt to ask for NGO or government aid. As a result, humanitarian relief only trickled in from those international organizations which discovered that the community had been affected. Water systems and psychological attention came months after the disaster. Residents sheltered in marginal urban communities of Ilopango and Changallo for up to 3 months. Suggesting that Joya Grande lacks the social resilience that is evident in Santa Maria.

Household surveys in each community (72 of 350 households in Joya Grande and 41 of 70 households in Santa Maria), tested the hypothesis that community organization was the most significant factor in climate shock resilience. Quantitative analysis of the results examined major differences in how each community recovered from the disaster. Santa Maria's superior organization is confirmed in an independent sample t-test comparing the perceived effectiveness of each *Junta Directiva*, or board of community leaders on general community organizing, emergency response, and reconstruction in Figure 6.

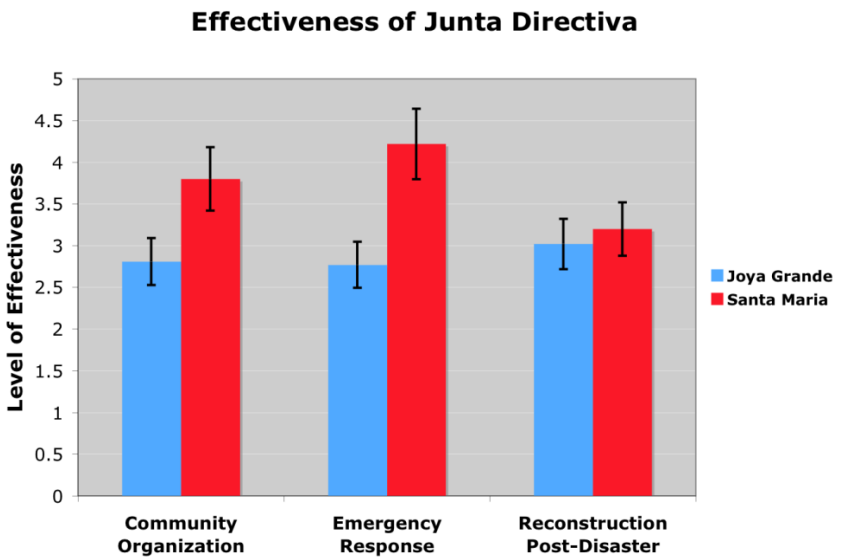


Figure 6. Perceived effectiveness of Junta Directiva in Joya Grande and Santa Maria. P-values for statistically significant differences: Community Organization (p=.001); Emergency Response (p=.001); Reconstruction (p=.529). Source: Author's own

Santa Maria's local governance is significantly more effective in general organization and emergency response than that of Joya Grande, though reconstruction efforts were perceived as insignificant. However, *Junta Directivas* are not the only form of social support. Households also listed eight different types of support: family, neighbours, churches, *Junta Directivas*, political parties, the community, municipal government, and NGOs. These types of support were then ranked on a scale of 1-5: A ranking of one meant no support was gained whilst a five represented an excellent source of support. Three sources of support significantly varied between the two communities: political parties, *Junta Directiva*, and community. All of which ranked higher in Santa Maria (see Figure 7).

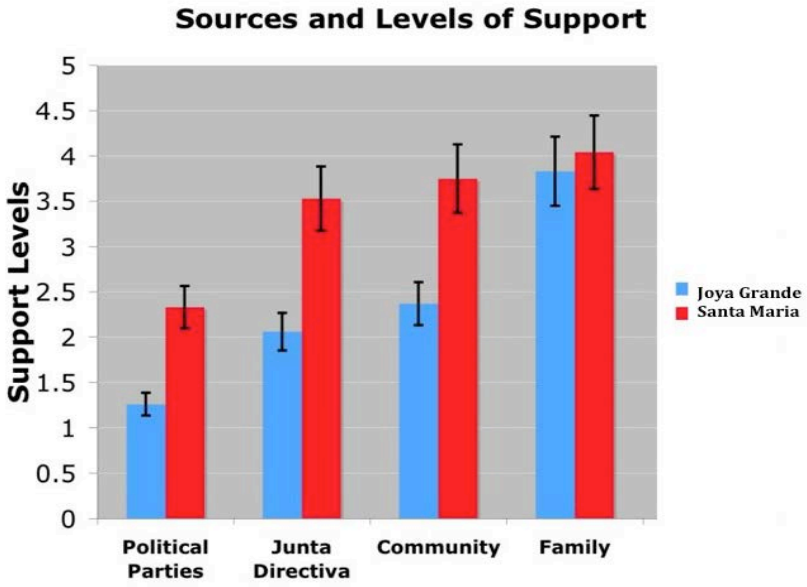


Figure 7: Sources and levels of support in Joya Grand and Santa Maria. Independent Samples T-test. P-values for significance: Political Parties (p=.077); Junta Directiva (p=.002,); Community (p=.001); Family, p=.458. Source: Author's own

The political party support given to Santa Maria is also not surprising given its history with the FMLN. The most notable and significant support factor is community organization and cohesion, evidenced by higher levels of support from the *Junta Directiva* and from the community in general, for Santa Maria. 'Binding' social capital like local leadership and solidarity were key to recovery after Ida and will continue to be a determining factor in climate change adaptation for resilient communities such as, Santa Maria.

4. Social Resilience, Disasters and Trajectories of Violence, Five Years Later

Unfortunately, violence (homicides, extortion, robbery, battery) has steadily increased since Hurricane Ida in the

region of Santiago Texacuangos and in communities like Joya Grande. In contrast, violence has not increased in Santa Maria. While official statistics do not disaggregate violence from the municipal to communal levels, cross validation from police interviews and news reports confirm that no homicides occurred in Joya Grande in the five year period before Ida (2004-2009), however, at least four homicides occurred in the five year post-Ida period (2009-2014). In this small community of around 1,500 people, this results in a homicide rate of over 50. The increase of violence in Joya Grande is not only experienced in homicides (Garcia 2012; La Prensa Grafica, 2013), but also extortion (ElSalvador.com, 2013), battery and robbery (Personal Interviews with Municipal Police, July 2014). In contrast to Joya Grande, Santa Maria de la Esperanza has had no reports of these crimes.

When interviewed, a policeman who has been working in the region since 2008 suggested that Hurricane Ida was the 'vector', an event that paved the way for the epidemic of violence into Joya Grande, whilst low social capital had permitted the violence to permeate the community. The already low social capital in the community pre-Ida was undermined further by the landslides of 2009, as local community leader Don Armando states "the soil erosion caused erosion of the social fabric." Ida destroyed livelihoods, though the loss of crops, restaurants and small family businesses, such as fish farms and chicken coops. Families without access to credit could not afford to rebuild livelihoods and made up for lost income by working in factories, or in one reported case, removing the eldest son from university. The community became increasingly divided along political party lines, as both parties competed for votes in the 2011 municipal election, by providing aid to specific lists of families. While quantitative community surveys comparing social capital pre- and post-Ida are unavailable, qualitative analysis clearly points to the destabilization of community organization, participation, unity and trust.

Due to the extended relocation of community members to marginal and dangerous urban areas, gangs obtained a foothold in the community. Families from Joya Grande spent up to three months in the shelter from November to January 2009 and during this time the gang, MS-13, recruited youth from the displaced community. Recruitment was made easier by the immense vulnerability of the youth including psychosocial trauma; lack of employment and education; lack of activities; and the presence of landslide scars and abandoned houses from families who never returned as discreet gathering places for illicit activities.

However, the factor most emphasized by Joya Grande residents as the reason for the community's inability to reduce violence is the same reason the community inadequately responded to the disaster; low social capital. Interestingly, police officers, in particular, emphasized the 'binding' social capital of community organization and trust as the most important foundation for violence prevention. In Santa Maria, the community was organized enough to know who comes in and out of the community and would not permit someone involved in gangs to continue to reside there. Furthermore, this community ran their own disaster shelter and unlike Joya Grande, did not have to temporarily migrate to other, more violent areas to

seek shelter. Santa Maria has the 'networking' social capital to organize outside resources and to stock their own shelter, even in absence of municipal or governmental aid. Joya Grande lacked the social capital to anchor participation, social cohesion and networking to protect their community from the threat of gang activity and violence.

In the example of these two communities, social capital is the foundation for mitigating and responding to adverse phenomenon, whether disasters or gang violence. Local police emphasized that it was not only the poorest communities that are most vulnerable to disasters in Santiago Texacuangos and El Salvador, but poor communities which lack community organization and social capital that are most vulnerable to both disasters and violence. While disasters are not the only cause of increasing violence in communities with low social capital, as seen in the case of Joya Grande, the aftermath of a disaster can become a tipping point or a pathway to introduce violence into an already vulnerable community. In addition, local police officers predict that the current situation of violence has further reduced the community's capability to respond to another climatic shock.

While a greater number of long-term case studies tracking violence rates in post-disaster communities would be required to make a conclusion, the juxtaposition of different violence and recovery trajectories for Joya Grande and Santa Maria highlights how violence, disasters and livelihood resilience are connected. In communities with low social capital, climate shocks can provoke the temporary migration that serves as a catalyst for gang violence and influence. In addition, the financial losses and food insecurity weakens social capital and reduces the capacity for a community to unite and respond to violence. The presence of extortion by gangs can increase financial risk and reduce incentives to open restaurants, stores, or transportation routes. Lack of livelihood options can provide another reason for youth to join gangs as an alternative, creating a continuous feedback cycle.

G. Social Resilience to Hurricane Mitch and Community Violence Trajectories in Honduran Resettlements

Honduras sits at the centre of both human vulnerability and natural disaster risk. As a nation with a low human development index, Honduras is faced with; high poverty; a young and growing population; endemic corruption; and extreme violence. Honduras has neither a strong state nor strong society on which to build resilience (Alaniz 2012a; UNDP, 2009). As well as human vulnerability, a confluence of factors has led to significant changes in land use in Honduras and increased environmental vulnerability (Leon and Lavell, 1996, p. 58). In 1960, 60 per cent of all land mass in Honduras was covered in pine, oak and various tropical hardwoods. By 2000, this figure had fallen to 49 per cent and by 2007 it dropped another 10 per cent. Over the last 47 years, this equals a loss of 30 per cent of forested areas (Lacey, 2007; World Bank, 2011). Honduras is also at high risk to major weather events. Statistically, at least once a decade, the nation will be hit- within 15 miles of the coast- by a major tropical storm or hurricane (Pielke et al., 2003). According to Freeman (2004, p. 10), "It is likely that natural disasters will be the most significant external shock to Honduras in the next 15-20 years."

5. Hurricane Mitch

As the fourth most powerful hurricane ever recorded in the Caribbean (NOAA, 2009), Hurricane Mitch (1998) devastated the small nation of Honduras, affecting nearly half of the population and displacing hundreds of thousands. United Nations Development Programme (UNDP), Deputy Resident Representative in Nicaragua, Nicola Harrington noted, "I don't know if we are talking about a [development] setback to the 1960s or the 70s…the only thing which is certain is that recovery and reconstruction will take a long, long time" (UNDP, 1998). After the hurricane, aid flooded into the country and the Honduran president promised that the nation would "build back better". Indeed, most Hondurans hoped that with the aid of foreign nations and non-governmental organizations (NGOs) they could utilize this disaster as an opportunity to address issues of poverty and crime in the country.

Unfortunately, this has not been most Hondurans' experience (Ensor, 2010). Although the nation's infrastructure was rebuilt, larger social issues remain: crime is ubiquitous, and corruption entangles many institutions, lowering citizen trust in government (Alaniz, 2012a, Ch. 4). Gang violence has earned the nation the infamous title 'homicide capital of the world'. Yet, this context contrasts sharply with the experience of some resettlements founded after Hurricane Mitch, which despite the difficult environment, have created communities with higher levels of social capital than many neighbourhoods that were not impacted by Hurricane Mitch. The following two case studies illustrate a feedback loop between violence and social health and indicate that social capital is a significant issue, which can be challenged and changed.

H. Ciudad Divina Providencia and Ciudad España

The two communities of Ciudad Divina Providencia (Divina) and Ciudad España (España), - given their similarities immediately after the hurricane in contrast to their dramatically different situations today - offer a strategic opportunity for a comparative analysis of community development. In response to Hurricane Mitch, NGOs built Divina and España to accommodate citizens from across Tegucigalpa who had lost their homes. Members of each community maintained comparable working and lower-middle class socio-economic statuses, racial homogeneity and each community had similar resettlement infrastructure. Both Divina and España were resettled in the Amarateca Valley, eighteen miles northeast of the capital (see Figure 5).

Re-settlement in the communities has been remarkably different: Divina thrives economically, sustains a low crime rate, it maintains high civic participation and a general sense of well-being and safety for vulnerable populations such as women and children. In contrast, gang problems, crime and other social ills such as drug and alcohol abuse trouble España. This 'natural experiment' of two similar communities beginning anew but experiencing drastically different outcomes offers a unique occasion for advancing understanding of post-disaster resilience opportunities and mechanisms that shape community developmental trajectories.

Table 2. Criminal Activity in Divina and España - 01/2004 to 12/2009

Community	# of crimes per 1,000 residents	Average # of crimes per year	Murders per 100,000 residents	Kidnappings per 1,000 residents	Rapes per 1,000 residents	Thefts per 1,000 residents
Divina	95.4*	42*	0*	.7**	.7	12.1**
España	270.7	116	30.42 †	.514	1.37	8.9

*Z-test significance at *.01, **.05*
† *The homicide rate in España (.49) averaged annually is still less than half of that in Tegucigalpa (100.13) (Honduras Weekly, 2011).*
Source: Source: Divina (2002-2010) and España (2004-2010) community police station records

Table 2 illustrates significant differences in crime between the two communities. España citizens are significantly more afraid to go out at night, mainly due to the high crime in their community. Additionally, when residents in both communities were asked to compare the delinquency rate of their pre-Mitch community with their current one, 96 per cent of Divina residents believe it is less while only 34 per cent of España citizens do. Based on the crime indicator alone, the difference in social health between the two communities is alarming. Although there are many factors that affect crime rates, residents and leaders repeatedly point to differing NGO practices as the most significant factor affecting crime rates.

I. Preventing Violence in Resettlements

One would expect that when two groups are drawn from the same population and provided with comparable economic and infrastructure resources, the groups would have similar outcomes. Yet, as seen in Table 2, this was not the case for España and Divina.

Alaniz, (forthcoming 2015), describes the 'liminal space' of post-disaster resettlements in which there is no pre-existing infrastructure or social structure, which can provide residents and the supporting NGO an opportunity to create resilience. In the case of Divina, the NGO worked with the community to create a strong vision and maintain it in the face of external and internal threats, including gangs, drug dealers and problematic families. Together they built a sense of trust, social cohesion and collective efficacy, creating a community with higher social capital.

However, España, had a different process and outcome: As with Divina an NGO helped create a community vision, but was less engaged in the maintenance of that vision. As a result, residents returned to the social structures they had known in Tegucigalpa. These social structures

promoted greater individuality, protection of self and property and did not encourage the type of resilience seen in Divina. Without this social resilience, gangs were able to enter the community, notably increasing the violence. Homicides became commonplace, reinforcing the lack of cohesion and trust among residents and the belief that violence was a part of the community, thereby leading to lower social resilience.

Resettlements, offer evidence and hope that a cycle of vulnerability and violence is not pre-determined. The mantra of 'build back better', when it includes infrastructure and social capital can lead to improved livelihoods among disaster survivors. It is difficult and requires significant time and resources, but it is possible.

J. Discussion

The cases presented illustrate both potential increase of violence in a post-disaster situation (El Salvador and Honduras) and increased vulnerability to disaster in places of violent conflict as theorized (see Figure 4). However, the same cases include examples of resilient communities that have escaped the climate-violence nexus. In the presence of strong social capital, community bonds and a collective vision, disasters might not lead to more violence after a climatic shock. In the context of climate adaptation, it is critical to understand the conditions under which violence and disaster vulnerability reinforce each other and what interventions might break the cycle.

6. When does Violence Increase Post-Disaster?

Violence can increase after climate shock when attention to social conditions is neglected, both in the immediate aftermath and in long-term resettlement (Ned et al., 2008). In El Salvador, the example of Joya Grande shows that extensive time in disaster shelters in marginal urban areas with a high rate of gang presence can facilitate urban gang recruitment of rural youth. In other communities, like Santa Maria, which has its own disaster shelter, youth who may be predisposed to join gangs are not exposed to the possibility in an urban shelter in another community. A focus on more localized disaster shelters that do not require urban migration to a 'safe space', or programs for youth in shelters for an extended period of time, could combat this potential pathway of increased violence in the immediate aftermath of a disaster.

Communities can also be vulnerable to increasing violence in the reconstruction and resettlement process post-disaster. The post-Mitch situation in Honduras contains many examples of communities like España, where resettlement focused on building physical infrastructure, neglecting the social infrastructure. The lack of focus on the community's social capital allowed violence and social disorder to obtain a foothold. Likewise, in the community of Joya Grande, El Salvador, a slow reconstruction and continuing erosion of social capital in the months and years following the disaster further exposed the community to violence that may have begun in urban shelters in the days following Hurricane Ida. In both cases, the community lacked a focus on violence prevention and community or institutional organizations

either did not or could not adequately respond to the situation.

However, disasters do not deterministically lead to more violence. Communities that have high social capital, or resettled communities where strong institutions have focused on building social capital, do not experience increased violence post-disaster. In Honduras, Divina has not experienced a single homicide since resettlement in 2002. This community has half the crime rate of neighbouring España. The NGO that founded Divina focused on building social capital and this commitment to construct the social fabric of the community effectively prevented violence and gang activity from becoming a larger problem, illustrating that post-disaster resettlement can provide better living conditions than residents held previously.

In the case of El Salvador, the high social capital of Santa Maria either directly limited the spread of violence post disaster, or was resilient enough to disaster that Hurricane Ida did not provide pathways to increase violence. For example, because Santa Maria had its own community shelter, vulnerable youth were not exposed to gang recruitment through temporary urban migration. In addition, the strong community organization led to rapid recovery post-disaster and the event did not erode the social fabric of Santa Maria, as it did in less resilient Joya Grande. Even if Santa Maria had gone to municipal shelters and youth had been successfully recruited by gangs, interviews with police express that, given the strong community organization it is unlikely that the community would have permitted gang members to continue to live there.

7. Lessons for Climate Adaptation and Livelihood Resilience

These cases not only illuminate the link between past climate shocks and violence, but also provide lessons when considering livelihood resilience and climate adaption for fragile states facing high violence. The importance of a holistic framework that considers disaster risk mitigation, climate adaptation and violence prevention together is essential. Further research and case studies are required to fully grasp how violent communities respond to disaster and violence trajectories after disaster events in fragile and violent states. A regional assessment of violence-climate hotspots could identify communities that require intervention and support to increase livelihood resilience. A more extensive compilation of best practices of communities like Divina and Santa Maria that have broken the violence-climate feedback loop may identify actions that could be replicated in ‘hotspot’ communities.

The results of this study also require a re-examination of current policies and practices. Disaster risk mitigation and resettlement programs or policies that neglect the potential for erosion of social capital and increased violence, should be revisited. Failed violence prevention policies of *mano dura* in Honduras and El Salvador do not address the erosion of social capital as a pathway to violence. Violence prevention policies must include provisions to strengthen community organizations.

8. Conclusion

It is not just the poorest countries that may be most vulnerable to climate change, but also the countries with highest rates of violence and conflict.

Analysis of past climatic shocks in countries such as Honduras and El Salvador provide evidence of non-linear feedback loops between cycles of violence and climate vulnerability. Lessons from these cases serve as a future warning to the potential of increasing climate shocks to increase violence in Latin America and in other countries in conflict. With the rise of violence in many parts of the world, implementing lessons about the importance of social capital to increase livelihood resilience to both climate shock and violence is critical for human well-being.

K. References

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Livelihoods are the lattice upon which all human organization hangs, and some of the worst-case scenarios of global change – displacement, migration, conflict and famine – all centrally concern the problems that people face in sustaining productive livelihoods.

The 2013-2014 Resilience Academy is a group of 25 international researchers and practitioners who have recognized that dangerous global change is a threat to the livelihood systems of the world's poor. The Academy met twice, in Bangladesh and Munich, Germany, and developed a set of working papers as an evidence base for the concepts and practices that we, as a cohort of colleagues, propose for addressing this pressing challenge.